REMARKS

The applicant has carefully reviewed and considered the official action and the references cited therein. Claims 1, 2, 6, and 11 have been amended for clarity. Support for all amended claims can be found in the specification, and no new matter has been added by these amendments. Reconsideration and withdrawal of the rejections are respectfully requested in view of the foregoing amendment and following remarks.

CLAIM REJECTIONS

1. Claims 1 and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Wu (2002/0115270).

The applicant traverses the rejection for the following reasons.

Amended claim 1 recites a method of forming a device isolation film in a semiconductor device, comprising the steps of: forming an active region on which ions are implanted for controlling a threshold voltage in a semiconductor substrate; forming a gate oxide film on the semiconductor substrate; forming a trench having a side wall to define the active region and an isolation region by etching a portion of the gate oxide film and the semiconductor substrate; forming a side wall oxide film within the trench by performing an oxidation process; *performing an ion implantation process into the semiconductor substrate of the active region* ***under the gate oxide film*** to compensate for a concentration of the ions implanted for controlling a threshold voltage; and forming an isolation structure by filling a oxide film inside the trench.

Wu fails to teach or describe the limitations of amended claim 1. Particularly, Wu fails to teach or describe a step of performing an ion implantation process into the semiconductor substrate of the active region under the gate oxide film, as recited in amended claim 1.

Referring to Wu, the field-encroachment implant without affecting the active area (Col. 2, paragraph [0016]) is performed into trench surface regions to form implanted regions 102b/200b and the surface regions102c/200c under the extended buffer spacers 104a as shown in Figs. 2A, 2B, and 3D. That is, the field-encroachment implant is performed into the trench surface regions in the isolation regions without affecting the active area by the

extended buffer spacers. As depicted in Figs. 2A and 2B, the implanted regions 102b/200b and the surface regions102c/200 are not formed under a gate oxide layer 107/201a.

Therefore, an ion implantation process is performed only once into an active region under the gate oxide layer in Wu.

However, the ion implantation process is performed twice into an active region (e.g., A) under the gate oxide layer (e.g., 12) in the present invention.

Accordingly, applicant respectfully submits that claim 1 is not anticipated by Wu.

Claims 2-5, which are dependent on claim 1, are also not anticipated by Wu for the reasons discussed above with respect to claim 1, as well as on their own merits.

2. Claims 1 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gardner (US. 5,985743) taken with Oda et al (US. 2002/0086498).

Applicants traverse the rejection for the following reasons.

Amended claim 1 recites a method of forming a device isolation film in a semiconductor device, comprising the steps of: forming an active region on which ions are implanted for controlling a threshold voltage in a semiconductor substrate; forming a gate oxide film on the semiconductor substrate; forming a trench having a side wall to define the active region and an isolation region by etching a portion of the gate oxide film and the semiconductor substrate; forming a side wall oxide film within the trench by performing an oxidation process; *performing an ion implantation process into the semiconductor substrate of the active region* ***under the gate oxide film*** to compensate for a concentration of the ions implanted for controlling a threshold voltage; and forming an isolation structure by filling a oxide film inside the trench.

Gardner and Oda fail to teach or describe the limitations of amended claim 1. Particularly, Gardner and Oda fail to teach or describe the following limitations of amended claim 1.

As indicated in the official action, Gardner lacks forming a sidewall oxide film within the trench and performing an ion implantation process into the semiconductor substrate of the active region under the gate oxide film.

Referring to Oda, an ion implanted into the surface of the trench at an angle 20° to 70° for sufficiently implanting into both upper corner portions of the trench, (Fig. 3, paragraph [0046]) not the active region under the gate oxide film.

Accordingly, amended claim 1 is clearly different from what is disclosed in Gardner and Oda, whether taken singly or in combination.

Claim 5, which is dependent on the base claim 1, is also patentable for the reasons discussed above with respect to claim 1, as well as on its own merits.

3. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wu (2002/0115270) or Gardner (5,985,743) taken with Oda et al (2002/0086498).

4. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wu (2002/0115270) or Gardner (5,985,743) and Oda et al (2002/0086498), taken with Hong (6,030,882).

5. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wu (2002/0115270) or Gardner (5,985,743) and Oda et al (2002/0086498) taken with Oda et al. (2002/0086498).

The applicant believes that the claims 2-4, which are dependent on the base claim 1, are also patentable for the reasons discussed above with respect to claim 1, as well as on their own merits.

6. Claims 6 and 14 are rejected under 35 U.S.C. 102(b) as anticipated by Wu (2002/0115270) taken with Sung (5,550,078).

Applicants traverse the rejection for the following reasons.

Amended claim 6 also includes the step of *performing an ion implantation process into the semiconductor substrate of the active region* ***under the gate oxide film*** to compensate for a concentration of the ions implanted for controlling a threshold voltage

However, Wu and Sung do not teach or suggest the step of performing an ion implantation process into the semiconductor substrate of the active region under the gate oxide film of the amended claim 6.

Accordingly, the applicant believes that the amended claim 6 is not anticipated by Wu and Sung and claim 14 depending on claim 6 is also in condition for allowance.

7. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wu (2002/0115270) and Sung (5,550,078) as applied to claim 6 above, taken with Oda et al (2002/0086498).

8. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wu (2002/0115270) and Sung (5,550,078) as applied to claim 6 above, taken with Hong (6,030,882).

9. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wu (2002/0115270) and Sung (5,550,078) as applied to claim 6 above, taken with Oda et al (2002/0086498).

10. Claims 7 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wu (2002/0115270) and Sung (5,550,078) as applied to claim 6 above, and further of Houlihan (2001/0021545) or Dong (2003/0119256).

11. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wu (2002/0115270) and Sung (5,550,078) as applied to claim 6 above, and further of Kim (2003/0067050) and/or Dong (2003/0119256).

12. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wu (2002/0115270) and Sung (5,550,078) as applied to claim 6 above, and further of Sung et al (6,180,453) and/or Dong (2003/0119256).

The rejection of claims 7-13 as being unpatentable is respectfully traversed, as it is submitted that the recited elements of amended claim 6 are not shown in applied references, whether taken singly or in combination.

Accordingly, the examiner is respectfully requested to pass this application to issue.

July 17, 2007

Respectfully submitted,

By_____

James P. Zeller, Reg. No. 28,491
MARSHALL, GERSTEIN & BORUN LLP
233 S. Wacker Drive
6300 Sears Tower
Chicago, Illinois 60606-6357
(312) 474-6300
Attorney for Applicant